15¢

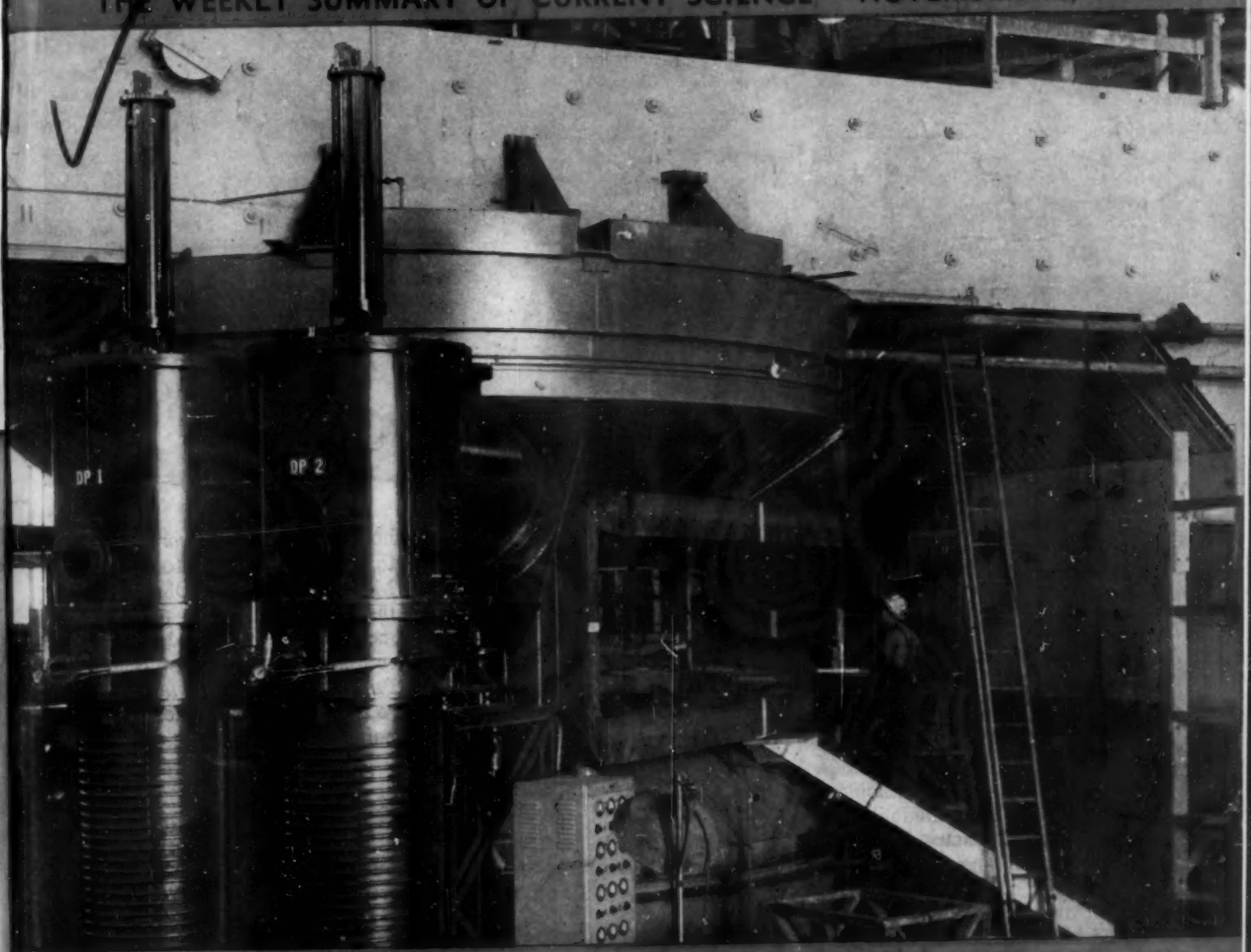
TECHNOLOGY DEPT.

SCIENCE NEWS LETTER

PUBLIC LIBRARY
NOV 21 1946
DETROIT

Vol. 50, No. 20

THE WEEKLY SUMMARY OF CURRENT SCIENCE • NOVEMBER 16, 1946

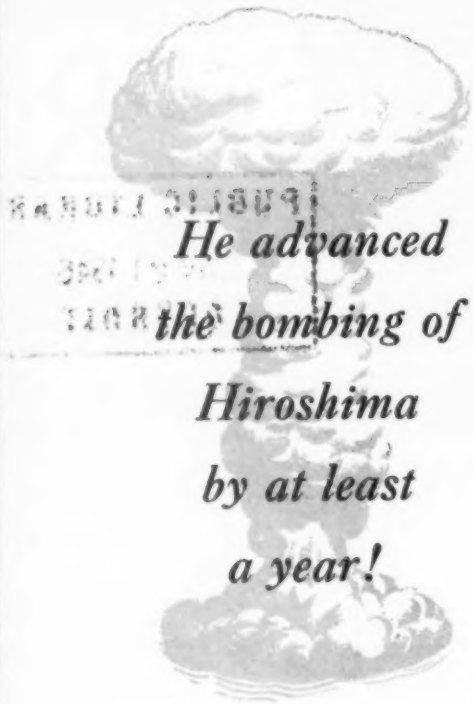


Giant Atom Smasher

See Page 308

A SCIENCE SERVICE PUBLICATION

1921 TWENTY-FIFTH ANNIVERSARY 1946



He advanced the bombing of Hiroshima by at least a year!

This is a "now it can be told" story of wartime research.

It started back in post World War I days when Dr. Harvey C. Rentschler, Director of Research for the Westinghouse Lamp Division, and Dr. J. W. Marden, an associate, decided to determine the melting point of a rare mineral . . . *uranium*.

In his unending search for an improved electric lamp filament, Dr. Rentschler wanted to find out if *uranium* would give better service than *tungsten*.

So Dr. Rentschler and his associates worked for about a year before they found a way to make pellets of pure uranium from which the melting point could be determined. Although uranium's melting point made it unsatisfactory for a lamp filament, Westinghouse continued to supply tiny amounts of the precious metal to colleges and research laboratories for experiments in nuclear physics.

(Little did they realize that their know-how would one day give America a head start in the race towards history's grimmest goal!)

For the most devastating war of all time had meanwhile blazed throughout the world—and scientists in many countries were feverishly trying to discover a method for unleashing the incredible energy concealed within the atom.

Then, early in 1942, Dr. Rentschler received a telephone call. The director of the atomic experimentation project at the University of Chicago wanted to know how soon Westinghouse could supply *three tons of pure uranium*!

Dr. Rentschler and his co-workers immediately went into action. They set up a miniature uranium "factory" in the Lamp Division laboratory—ultimately increasing their production of pure uranium from 8 *ounces to* 500 *pounds daily*, cutting its cost from $1,000 *to* $22 *a pound*.

And within a few months, Westinghouse had supplied *more than* three tons of the vital metal to the Chicago Metallurgical Project Office . . . where the famous "atomic pile" experiments were conducted. They also supplied uranium to physicists at Princeton University who did much to the pioneering work on the atomic bomb.

. . . . . It all started as an obscure experiment to find a *better* lamp filament—like many another quest for product improvement that goes on constantly in the great Westinghouse research laboratories.

But, today, Dr. Rentschler's work of 20 years ago is given full credit for advancing America's atomic bomb activities by at least a year!

Westinghouse

PLANTS IN 25 CITIES OFFICES EVERYWHERE

Tune in: TED MALONE—*Monday, Wednesday, Friday, 11:45 am, EST, American Network*

CHEMISTRY

Penicillin Made by Man

Better penicillins even than the mold makes are expected to come from laboratories. Only a small quantity for research has been made.

► NEW AND BETTER penicillins are expected as a result of the duplication in the laboratories of this mold chemical announced by chemists of Cornell Medical College in the journal, *Science*, (Nov. 8).

The scientists who synthesized penicillin and are now at work synthesizing new penicillins are Prof. Vincent du Vigneaud and associates, Frederick H. Carpenter, Robert W. Holley, Arthur H. Livermore and Julian R. Rachele.

Chemical remedies for such still-unconquered diseases as tuberculosis, the common cold, influenza and infantile paralysis may be forthcoming, now that chemists have learned how to synthesize penicillin and to change and perhaps improve its chemical make-up. That is something the mold itself could not do.

Laboratory Product

Synthetic penicillin is still a laboratory product. The very small amount of 10 milligrams is all that has been made so far. It takes over 30,000 milligrams to make an ounce. There is no chance whatsoever of commercial production of synthetic penicillin at the present time, stated Prof. du Vigneaud. He pointed out, however, that throughout the history of chemistry it has usually been the case that if a substance can be synthesized at all, the method can be improved and commercial production becomes possible.

An unusual feature of the synthesis of penicillin is that it was done without knowing the exact architecture of the penicillin molecule. Ordinarily, chemists start with knowledge of this architecture, called a structural formula, and proceed to build up the molecule.

All during the war American and British chemists, working in the secrecy demanded by military security, tried to learn the architecture of the mold chemical that was saving battle-wounded and, later, civilian victims of deadly infections.

In the early stages, the majority of chemists working on the problem favored an oxazolone-thiazolidine structure. Scientists at Oxford University in England and at Merck and Company in the United States independently and almost simultaneously in the first months of 1944 obtained a chemical of this architecture which had anti-germ activity like penicillin's. But they had such minute amounts of material that some of the scientists collaborating on this war research thought the antibiotic activity might be due to something other than penicillin.

Structure Not Right

The architecture of the compound they were working with, it then turned out, was probably not correct for penicillin. That was the situation in January, 1946, when the OSRD contracts terminated. Up to that time, 38 groups of scientists, 17 in Britain and 21 in the United States, had been working on the problem under OSRD and British Medical Research Council auspices.

In the first few months of 1946, Prof. du Vigneaud and his associates succeeded in isolating crystalline penicillin and proving its identity with the natural product.

One of the first things they did to prove their synthetic white crystals really were penicillin was to compare their activity against seven different bacteria with that of natural penicillin. The two penicillins had the same action against the bacteria.

Synthetic Passes Test

Having passed this bacterial spectrum test, synthetic penicillin was next put through a really tough one. This was the excretion test in which the same amounts of natural and synthetic penicillins were given to rabbits and the amounts of each which the animals excreted were measured. The ratio of excreted penicillin to the dose was the same for both penicillins.

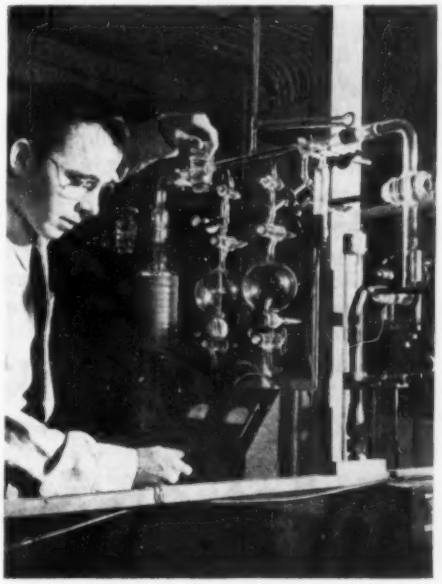
Radioactive sulfur was used in preparing another batch of synthetic penicillin. Natural penicillin was added and then isolated as a triethylammonium salt. This salt contined radioactive sulfur and held it through two recrystallizations and through conversion to two derivatives.

When the enzyme, penicillinase, which rapidly inactivates natural penicillin was added to the synthetic, this was inactivated in the same way. Synthetic penicillin also showed the absorption band in the infrared region characteristic of natural penicillin.

Part of the battle to prove that the synthetic material actually was penicillin consisted in fractionations to "fish out the active material in higher and higher concentrations," Prof. du Vigneaud explained. His group finally succeeded in obtaining synthetic penicillin at a concentration of 270 units per milligram.

"Particularly noteworthy," he points out, is the fact that the synthetic penicillin finally obtained is the same optical isomer as natural penicillin although there could be about eight isomers of penicillin.

Science News Letter, November 16, 1946



MOLECULE TARGETS—Apparatus reveals by microwave the kind of gas molecules present and the behavior of their atoms. The ammonia is contained in the glass bulb on the left. It passes into the long rectangular "barrel" or waveguide which extends across the lower part of the picture. When the vibrations of the gas are "in tune" with the vibrations of the microwaves, the microwaves are absorbed and a study of the absorption can be made. Research is being done at Westinghouse laboratories.

MEDICINE

Seven Scientists Honored

➤ FOR THEIR PART in helping to win victory over disease and death, seven individual scientists and five groups of scientists received the Lasker Awards of the American Public Health Association at its meeting Nov. 12.

Because better control of diabetes may come through his discovery of the first real clue to how insulin helps the body burn sugar, the first $1,000 award will be given to Dr. Carl Ferdinand Cori, of Washington University School of Medicine.

Dr. John Friend Mahoney, U. S. Public Health Service senior surgeon, receives the award for his first use of penicillin to treat syphilis.

For discovery of the Rh blood factor the third award will be presented jointly to Dr. Philip Levine, of Plainfield, N. J., Dr. Alexander S. Wiener of Brooklyn, and to Ernest Landsteiner for his father, the late Dr. Karl Landsteiner.

Dr. Alfred Newton Richards, University of Pennsylvania professor of pharmacology, receives the fourth $1,000 award for the many vital wartime medical achievements made under the OSRD committee on medical research of which he was chairman.

For his successful fight against malaria and yellow fever, Dr. Fred L. Soper of the Rockefeller Foundation's International Health Division will receive the fifth $1,000 award.

Awards in the form of citations and Winged Victory statuettes in silver (the individuals above receive golden statuettes in addition to the cash awards) will be made to the following: U. S. Bureau of Entomology and Plant Quarantine for its work in controlling insect borne diseases and particularly for its research on DDT. Dr. Fred C. Bishopp will accept the award for the group.

The Army Epidemiological Board which protected our men against epidemics during the war and developed an effective vaccine against influenza. Dr. Francis G. Blake, chairman and Yale Medical School dean, will accept for the group.

The National Institute of Health of the U. S. Public Health Service, for notable work during the war in the fight against dysentery, malaria and typhus and aid in protecting the health of atom bomb workers. Dr. R. E. Dyer, director, will accept the award for the group.

The Northern Regional Research Laboratory, U. S. Department of Agriculture, for making possible mass production of penicillin. Dr. G. E. Hilbert, present director, will accept for the group.

The Board for the Coordination of Malarial Studies, under whose auspices were developed a cure for one kind of malaria; new and better remedies for other malarias, and development of rational use of available remedies with consequent removal of malaria from the field of tactical importance to the armed forces.

Science News Letter, November 16 1946

NUCLEAR PHYSICS

Cyclotron Smashes Nuclei

See Front Cover

➤ FOR THE FIRST time in the world's history, a 200,000,000-electron volt beam of heavy hydrogen atomic hearts has been produced. This was the first experiment with the 4,000-ton supercyclotron, shown on the cover of this SCIENCE NEWS LETTER, just put into operation at the University of California.

Dr. Ernest Lawrence, Nobelist and cyclotron inventor, reported that the deuteron beam was used to bombard beryllium and that a sharp, intense beam of high energy neutrons resulted from the bombardment.

Engineering work by the University of California radiation crew headed by Prof. Robert L. Thornton and William Brobeck, called "brilliant" by Dr. Lawrence, solved operating difficulties more quickly than expected.

Several months of experiments were planned with the giant instrument without major changes. Scientists predicted results more important than the previous accomplishments with cyclotrons. The atomic bomb element, plutonium, was made in a smaller cyclotron. Many entirely new nuclear reactions may result from work with the new 184-inch cyclotron.

Its construction was financed mainly by a gift of $1,150,000 from the Rockefeller Foundation, which was augmented by funds from the Research Corporation, the John and Mary Markle Foundation and the University of California. Its completion is being forwarded with the assistance of the Manhattan District.

Two other types of atom-smashers are being studied. A 300,000,000-volt synchrotron is being built under the direction of Dr. Edwin M. McMillan and is scheduled to be completed early next year. Theoretically more powerful than either of the other types is the linear accelerator proposed by Dr. Luis W. Alvarez. A model of this atom smasher, believed capable of accelerations as high as billions of volts, is also under construction.

Science News Letter, November 16, 1946

SCIENCE NEWS LETTER

Vol. 50 **NOVEMBER 16, 1946** *No. 20*

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C. NOrth 2255. Edited by WATSON DAVIS.

Subscriptions—$5.00 a year; two years, $8.00; 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

Copyright, 1946, by Science Service, Inc. Republication of any portion of SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service.

Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

The New York Museum of Science and Industry has elected SCIENCE NEWS LETTER as its official publication to be received by its members.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., PEnnsylvania 6-5566, and 360 N. Michigan Ave., Chicago, STate 4439.

SCIENCE SERVICE

The Institution for the Popularization of Science organized 1921 as a non-profit corporation.

***Board of Trustees**—Nominated by the American Association for the Advancement of Science:* Edwin G. Conklin, American Philosophical Society; Otis W. Caldwell, Boyce Thompson Institute for Plant Research; Willard L. Valentine, Editor of Science. *Nominated by the National Academy of Sciences:* Harlow Shapley, Harvard College Observatory; Warren H. Lewis, Wistar Institute; R. A. Millikan, California Institute of Technology. *Nominated by the National Research Council:* Hugh S. Taylor, Princeton University; Ross G. Harrison, Yale University; Alexander Wetmore, Secretary, Smithsonian Institution. *Nominated by the Journalistic Profession:* A. H. Kirchhofer, Buffalo Evening News; Neil H. Swanson, Executive Editor, Sun Papers; O. W. Riegel, Washington and Lee School of Journalism. *Nominated by the E. W. Scripps Estate:* Max B. Cook, Scripps Howard Newspapers; H. L. Smithton, Executive Agent of E. W. Scripps Trust; Frank R. Ford, Evansville Press.

***Officers**—President:* Harlow Shapley. *Vice President and Chairman of Executive Committee:* Alexander Wetmore. *Treasurer:* Frank R. Ford. *Secretary:* Watson Davis.

***Staff**—Director:* Watson Davis. *Writers:* Frank Thone, Jane Stafford, Marjorie Van de Water, A. C. Monahan, Martha G. Morrow, Ronald Ross. *Science Clubs of America:* Joseph H. Kraus, Margaret E. Patterson, Henry Platt. *Photography:* Fremont Davis. *Sales and Advertising:* Hallie Jenkins. *Production:* Dorothy Reynolds.

ASTRONOMY

Giant Telescope Designed

World's second largest telescope, 120-inch reflector that operates on a fork mount, has been designed. Construction will start next year.

➤ THE DESIGN of the world's second largest telescope, the 120-inch reflector at the University of California's Lick Observatory, is almost completed and construction will start next year.

A scale model one-sixteenth actual size has been built by the designer, W. W. Baustian, to solve in a miniature observatory the problems which will be encountered in the telescope's operation. Cost of the instrument is estimated at $1,200,000, and construction will take at least four years.

For the first time a fork type mount will be used on a large telescope, the 53-foot tube and eight-ton, 16-inch-thick mirror of the Lick giant resting in a two-pronged 70-ton steel fork. The hollow fork can be rotated at will on its polar axis by a motor, while a second motor in the fork will drive the 35-ton tube and mirror.

With this mount the whole sky, with the exception of the area five degrees above the horizon, can be covered without the requirement of excessive space and heavy counterweights in changing the position of the tube.

Inside the 90-foot diameter dome housing the instrument, mechanized platforms and stairways will permit ready access to any part of the telescope.

Dr. C. Donald Shane, director of the Lick Observatory, said that the instrument has been designed along conservative lines in order to permit the installation of any type of auxiliary equipment usable on large telescopes. It will be possible to install the prime, Newtonian, Cassegrain and Coude focuses.

Lessons learned in the construction of the 200-inch telescope at Mount Palomar, the 100-inch mirror at Mount Wilson and other large instruments have been used to good advantage in the design. On advice of Palomar designers the mirror will be of solid disc glass, making for easier grinding and polishing and freedom from bending under its own weight than a sectioned type glass.

Dr. Shane said the mirror will take astronomers 900 million light years out into space, bringing within visibility fainter stars and stellar systems beyond reach of all but the Palomar telescope.

A cooperative research program will be undertaken by Lick and Palomar astronomers, in order to avoid duplication of effort with the two telescopes, Dr. Shane stated.

In addition to the more detailed study of brighter stars, the 120-inch telescope will permit investigations of remote galaxies beyond the Milky Way.

"An understanding of the motions and detailed structural features of the nearer galaxies affords the most fruitful means of understanding the structure and evolution of the universe," Dr. Shane stated.

Science News Letter, November 16, 1946

MODEL, NOT TOY—This model of the 120-inch reflecting telescope to be constructed at the University of California's Lick Observatory is scaled to one-sixteenth of the actual size. Figure in fork is reduced to same scale as model.

OPTICS

Test for Farsightedness

➤ FARSIGHTEDNESS, which handicaps many a school child so greatly that he hates school, can now be detected by a simple, accurate test, Dr. David Van der Slice, Flint, Mich., director of school health program, declared at the meeting of the American School Health Association.

The new test is called the Plus Sphere test. It is one of a battery of tests in the Massachusetts Vision test developed by eye specialists, educators and psychologists.

The test is made with the Snellen (symbol E) chart but with the child wearing plus sphere glasses which shorten the focal length of the reflected light rays. The child is asked to read the 20 line on the chart. If he can read it correctly, he is farsighted. The child who is not farsighted will complain that the symbols are blurred because the plus sphere glasses prevent the light rays from focusing on his retina, as they must for clear vision.

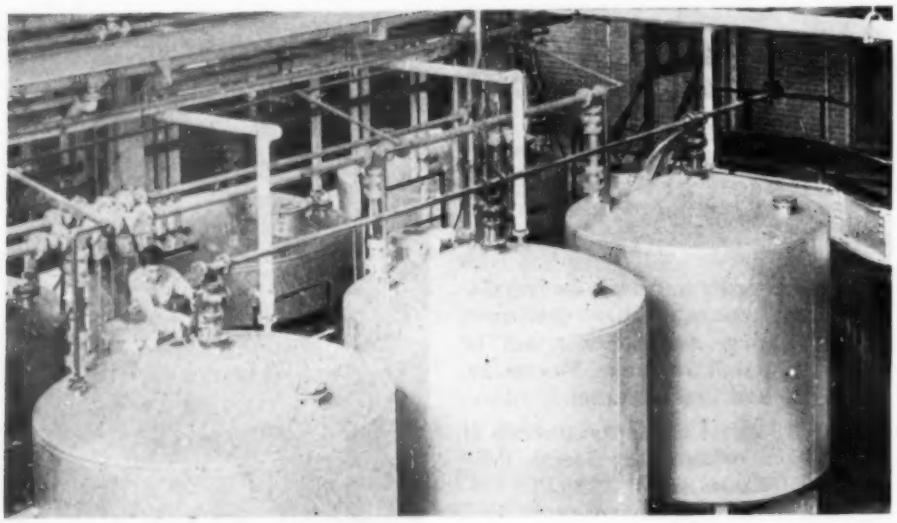
Only those who pass the ordinary Snellen test are given the plus sphere test. Cases of nearsightedness are almost always discovered with the Snellen test, but farsightedness is only rarely uncovered by it and then only in the very severe types.

Farsightedness is a much more common defect than nearsightedness. Farsighted children are severely handicapped in their school work. Some are able to overcome the defect enough to see their lessons, but this usually causes eyestrain and headache, especially toward the end of the day. The symptoms may become so aggravated that to do near work is very uncomfortable and the child, therefore, does not like school.

About 7% of the children tested fail the plus sphere test, compared with about 17% who earned a score of 20/30 in both eyes on the Snellen test, Dr. Van der Slice reported.

The plus sphere test, he acknowledged, is open to some controversy on the amount of plus sphere in the glasses but the limits were set by a group of nationally prominent eye specialists after a two-year study in which more than 6,000 children were tested and checked against an eye specialist's examination.

Science News Letter, November 16, 1946



PILOT PLANT—The Northern Regional Research Laboratory of the U. S. Department of Agriculture at Peoria, Ill., tests on a semi-commercial scale new processes for making alcohol from various farm products.

SEISMOLOGY-OCEANOGRAPHY

Sea Wave Prediction

Alarmists frightened coastal dwellers in the region of a recent submarine earthquake, although seawaves cannot be forecast from earthquake data alone.

➤ NEEDLESS fears, and hurried abandonment of their homes by seacoast dwellers in Hawaii, were caused by "scare" reports that a big sea wave, similar to the one that drowned 140 people last April 2, was sweeping down the North Pacific from the Aleutian islands on Nov. 1, following the occurrence of a severe submarine earthquake in that region.

Destructive sea waves start from submarine earthquakes, but not every such earthquake starts a sea wave. It is therefore impossible to predict such waves simply from the occurrence of submarine quakes.

Despite the chanciness of forecasting sea waves on the basis of earthquake data alone, seismologists of the U. S. Coast and Geodetic Survey did venture a qualified prediction as soon as they saw the trace of the Aleutian disturbance on their seismograph. They said: first, there might be no wave at all; second, if a wave did reach Hawaii it would probably not be at all severe.

Somewhere along the line of transmission, this very conservative statement got blown up into major-alarm proportions. At the predicted hour, watchers on the Hawaiian coast observed a very modest rise in the ocean, but no disaster-bearing wave such as they had been led to expect. It was very close to what the scientists in Washington had said might happen.

The seismologists, in the meantime, went ahead and made a "fix" of the epicenter, on the basis of data gathered telegraphically from nine seismological stations reporting through Science Service. The quake centered under the sea south of Atka island in the Aleutians. This is a point about 450 miles southwest of the epicenter of the disaster-causing earthquake of April 2.

It was a severe disturbance. On the Gutenberg scale of 10 for the most violent quakes, it rated 7.25. The April 2 earthquake rated 7.5, only a little more severe.

Observatories reporting were those of the California Institute of Technology, Pasadena; University of Washington, Seattle; Dominion Observatory at Ottawa; stations of the Jesuit Seismological Association at St. Louis University, Georgetown University, Xavier University in Cincinnati and Springhill College in Alabama; and the stations of the U. S. Coast and Geodetic Survey in Tucson, Ariz., and Washington, D. C.

Science News Letter, November 16, 1946

ENGINEERING

Plant To Produce Alcohol From Farm Waste Products

➤ MOTOR FUELS made synthetically from farm wastes have entered production in an experimental plant at Peoria, Ill., of the U. S. Department of Agriculture.

The plant will produce alcohol. It is the Bureau's contribution to the government's research program for producing liquid motor fuels from non-petroleum sources. Production from agricultural products was assigned to Agriculture; production from oil-bearing shale, coal and natural gas is under research by the Bureau of Mines.

The new plant will handle enough farm residues to provide fermentable material for the production of 500 gallons of alcohol daily. At capacity, it will produce 2,000 pounds of glucose in 10% solution, 1,600 pounds of hylose in 15% solution, 200 pounds of furfural, and 1,000 pounds of liquid in eight hours.

The process used in the new plant, for producing fermentable sugars from which the liquid fuels are obtained, is an outgrowth of research at the Northern Regional Research Laboratory of the Department of Agriculture by Drs. E. C. Lathrop and J. W. Dunning. The farm wastes to be used include corncobs, sugarcane bagasse, peanut shells, flax shives, and the hulls of oats, cottonseed, and rice. Grain straw and cornstalks can also be used in the process. They are the waste products that are available in fairly constant quantity each year.

Science News Letter, November 16, 1946

INVENTION

Hydraulic Jack to Alter Airplane Wing's Camber

➤ THE OLD dilemma of the camber of an airplane's wings, which should be thick for takeoff and climbing but thin for speed in flight, has challenged Jacque Fresco of Hollywood, Calif., for patent 2,410,056. His solution is a small hydraulic jack in the cavity of the wing, with ribs radiating from top and bottom to change the wing's shape as the jack is operated.

Science News Letter, November 16, 1946

If all the land under *irrigation* works built by the U. S. Bureau of Reclamation were lumped together, it would make an area larger than Connecticut and Rhode Island combined.

MEDICINE

Eyes Saved from Chemicals

Eyes suffering from alkali and chemical burns can be successfully healed by removing the outer layer of the cornea. Treatment helps acid burns.

➤ EYES BURNED by chemicals can be saved by denuding the cornea of its outer layer. This new treatment, developed during seven years of research, was announced by Dr. Ralph S. McLaughlin, consultant in industrial ophthalmology of South Charleston, W. Va., at the meeting of the Industrial Hygiene Foundation.

Treatment of complications of chemical burns of the eyes in the past has been at best make-shift and almost always unsatisfactory, Dr. McLaughlin declared.

A dye, fluorescein, is used to tell whether the denuding operation is necessary. When this is dropped in the eye a green stain appears if the cornea has been damaged.

A number of opaque spots on the transparent cornea will be seen under the bio-microscope in all cases when alkaline and injurious neutral compounds have gotten into the eye. These spots, looking like deposits of grayish-colored material, are actual collections of the chemical, Dr. Henry F. Smyth and associates of the Mellon Institute of Pittsburgh found. They give the solution to the proper treatment of the condition.

Acid burns do not show these spots but such burns heal more quickly if the denuding treatment is given.

This treatment consists in carefully wiping the outer layer of the cornea from its attachment. It is done with a circular motion, from the center outward, using a toothpick swab. Cocaine in the eye relieves the patient of pain during the operation. At first Dr. McLaughlin removed the entire outer layer of the cornea, called the epithelium. Now he finds it is only necessary to remove such cells as have been damaged by the chemical. The bio-microscope is used to check this. The conjunctiva lining the eyelids is also carefully denuded.

The eye should be healed within 24 hours, certainly within 48 hours. If not, Dr. McLaughlin suspects complications, often from infections in teeth or tonsils. These are immediately treated or removed. In some cases ulcers on the cornea which would not heal, healed overnight when the source of the infection had been removed.

The extreme pain which follows the denuding operation is relieved by a half percent pontocain ointment. It can be used as often as necessary to keep down pain without fear of damage to the eyes.

Delay of more than six hours in getting a chemical eye burn victim to the doctor is "unforgivable," Dr. McLaughlin declared. Results will be "excellent" if he gets to the eye doctor within two hours.

Science News Letter, November 16, 1946

AGRICULTURE

Heat Rays To Save Crop

➤ INFRARED HEAT rays from an oil-burning heater developed at the Michigan State College agricultural experiment station may save farmers some of the millions of dollars lost each year from late spring and early fall frosts.

The experimental burner developed can keep the temperature over one acre eight degrees warmer than outside temperatures at a cost of 75 cents per hour. This is expected to prove most useful protecting the high-cost-per-acre crops such as fruits, berries, truck gardens and flowers.

Infrared heat warms the plants directly without warming the air, a large economy of heat.

Cost of the experimental model was $250, but engineers believe that a burner large enough to protect one acre can be produced for one-third to one-half that figure.

Frost damage, which in Michigan alone runs as high as $20,000,000 some years, is generally caused in a few hours by only a slight dip in the temperature. These early fall or late spring temperature tumbles could generally be rendered harmless by a unit such as the new infrared oil heater.

FROST DEFENSE—Machine uses infrared heat to prevent frost damage. It was developed at the Michigan State College Agricultural Experiment Station.

Electrical units have been experimented with, but they proved to be too expensive to be practical. The oil heater will only be useful where the crop has a high value per each acre.

Tests are continuing with the heater to increase its efficiency and coverage.

Science News Letter, November 16, 1946

ENGINEERING

Progressive Chilling Separates Wax from Oil

➤ WAX is one thing refiners usually want to get out of oil. In a new process, on which patent 2,410,483 was granted to E. M. Dons and O. G. Mauro of Tulsa, this is accomplished by progressive chilling. The wax-containing oil is first heated, then chilled de-waxing solvent is injected into the hot oil stream.

This causes the formation of a cloud of minute wax crystals. Additional increments of de-waxing solvent are injected at progressively lower temperatures, which causes rapid growth of the crystals. Finally they are removed by filtering.

Rights in the patent are assigned to the Mid-Continent Petroleum Corporation.

Science News Letter, November 16, 1946

ASTRONOMY

New Telescope Has Only One Eyepiece

➤ FROM THE Netherlands, where Galileo got his idea for that first revolutionary telescope of his, comes something radical in telescope design. It was developed by Albert Bouwers of Eindhoven, who has been granted patent 2,409,186.

Most large telescopes are accompanied by instruments of much smaller power, used as finders. When the observer has spotted his star, he shifts from the eyepiece of the finder to that of the main instrument—sometimes an inconvenient process.

To permit the same eyepiece to be used for both objectives, the Bouwers design interposes a small, movable mirror at a slight angle, about midway of the tube. This throws the small objective out of action, and catches light sent from the big lens through a train of mirrors in the other tube, including one large, concave mirror at its base, in which most of the light-focussing is accomplished.

Because this patent was processed while the Netherlands lay in the hands of the Nazis, rights in it are vested in the Alien Property Custodian.

Science News Letter, November 16, 1946

ICHTHYOLOGY

Male Fish Incubates Eggs By Carrying in His Mouth

➤ A MALE FISH that incubates the eggs by carrying them in his mouth is one of the latest oddities in the 28,600 specimens brought to the U. S. National Museum collections by American scientists surveying the fish and game resources of the Central American Republic of Guatemala.

Dr. Robert R. Miller of the Smithsonian Institution, who directed the fish survey, reports the egg-hatching male, a curious fresh-water catfish, not only incubates the young in his mouth but probably occasionally cradles the young there. From time to time baby fish return to the father's mouth for shelter after they are hatched, Dr. Miller believes.

During all this time, the male "mother" does not eat.

Other odd species from lowland Lake Yzabal include a fresh-water shark and a fresh-water sawfish, both groups generally being found in salt water. These may prove to be hitherto unknown.

Another fish-story specimen discovered in the Guatemalan lake is a night-prowling "bare-eyed" fish, the gymnotus. It's an eel-like creature with hardly any eyes which hides by day and ventures forth only at night.

The introduction of good game fish in the upland lakes of the country is a major aim of the survey, conducted jointly by the Smithsonian Institution, the U. S. Fish and Wildlife Service and the State Department.

Science News Letter, November 16, 1946

NUCLEAR PHYSICS

Energy Must Be Used, Not Outlawed to Waste

➤ ATOMIC BOMBS can not be outlawed, the Society of Automotive Engineers was told by Dr. H. B. Hass of Purdue University, Indiana. At the same time, he urged nations to use the new atomic energy constructively for peacetime purposes.

Military history shows no example of the successful outlawry of any such really effective weapon, he declared. Never before was it more effectively demonstrated that science is power: power to do good or evil. The problem now is to develop peacetime uses for the new energy, and persuade people to want to use it for good.

Whether atomic energy can be harnessed for constructive peacetime use is only a matter of time. The whole history of science shows that every new form of energy discovered has been successfully harnessed.

While the United States may keep the secret of the atomic bomb's manufacture for a few years, this scientist of the Manhattan District project added, in the near future any nation which wants to spend the necessary research can have atomic bombs.

Science News Letter, November 16, 1946

CHEMISTRY

Sugar Fermentation By Yeast Yields Glycerin

➤ GLYCERIN is produced from sugar by fermentation with ordinary yeasts by Dr. Carl A. Neuberg, New York City, and Irene S. Roberts of Fieldston, N. Y., for patent 2,410,518. Secret is two-fold: very heavy inoculation with yeast culture, and maintenance of relatively high acidity during fermentation.

Science News Letter, November 16, 1946

IN SCIENCE

CHEMISTRY

Unique Plastic Makes Excellent Insulator

➤ A UNIQUE plastic with unusual electrical properties was described at the meeting of the Society of the Plastic Industry by E. B. Yelton of the Du Pont Company. Its trade name is "Teflon." It is unharmed by temperatures up to 575 degrees Fahrenheit, he said, and withstands every known solvent.

It is an excellent insulating material for the ultra-high frequencies required by radar and television, having extremely low dielectric loss even at frequencies up to 3,000 megacycles. It does not dissipate the electric power as do most organic insulators when subjected to high-frequency currents. It is an excellent material at extreme low temperatures, and may be flexed without cracking at 150 degrees below zero Fahrenheit.

Science News Letter, November 16, 1946

MEDICINE

Benadryl Sleepiness May Cause Accidents

➤ BENADRYL, new hayfever drug, makes some patients so sleepy that they may have accidents when driving automobiles or operating moving equipment and machinery, Drs. Benjamin J. Slater and Nathan Francis of the Eastman Kodak Company warn in the *Journal of the American Medical Association* (Sept. 28).

An accident in which benadryl sleepiness may have played a part is reported by them. The patient was told to take the benadryl at 4 a. m. because that was the time when his hayfever bothered him most. However, he did not take it until 7 a. m. on the day of the accident. He started work at 8 a. m., feeling drowsy. An hour later, he lost control of an electric platform cargo truck he was driving. Fortunately, he jumped off in time and was not hurt. The vehicle went off the platform and was wrecked. While there is no specific evidence that the sleepiness from the benadryl caused the accident, the doctors suggest it may have played a part.

Science News Letter, November 16, 1946

NCE FIELDS

CHEMISTRY

Plastic Industry Faces Shortage of Chemicals

➤ PLASTICS may be made of raw materials abundant in nature, the popular belief, but plastics making requires vast quantities of basic chemicals some of which are now in short supply. The plastics industry is dependent on these chemicals.

The shortage is already reflected in the output of the plastics industry, Frank H. Carman, of the Plastics Materials Manufacturers Association, told the Society of the Plastics Industry. He cited strikes in the coal, steel and chemical industries as one cause of a severe curtailment in the supply of many basic materials.

Among the chemicals now short, or facing an early shortage, are phenol, which is now exceedingly tight, cresols and cresylic acids, phthalic anhydride, urea, formaldehyde and glycerine. The shortage of glycerine is due primarily to the international shortage of fats and oils and the absence of a normally large supply of copra from the South Pacific.

Science News Letter, November 16, 1946

INVENTION

"George" Can Sleep, Too, In New Pullman Car

➤ AT LONG LAST, poor "George" gets a break. The Pullman porter is to be given a place of his own to sleep in.

For decades, the porter has had to take his sleep where he could find it. Usually, after putting all the sleepy passengers to bed, shining their shoes, and waiting for the bull session in the men's smoking compartment to break up, he has stretched his weary frame on the not-too-soft long seat in that room and snoozed as well as he could for a few hours.

A new design for a sleeping-car, on which U. S. patent 2,410,173 has been issued to L. A. Lutherman and E. L. Thompson of Chicago, changes all this. The car is of the newer type, compartmented like European railway coaches, with three-decker berths crosswise instead of parallel to the sides.

The porter's sleeping space is the upper berth in the compartment next to the washroom. It is, however, solidly partitioned off from the rest of the compartment, giving its occupant complete privacy, and it is entered by means of a couple of ladderlike steps on the washroom side of the bulkhead. It has exactly the same kind of mattress and bedding as the passengers' berths, and is fitted with its own private ventilator.

Science News Letter, November 16, 1946

PSYCHIATRY

Overwork Is Symptom Of Mental Sickness

➤ OVERWORK is often a symptom of mental sickness, Dr. Thomas A. C. Rennie, Cornell Medical College psychiatrist, warned at the meeting of the Nation Committee for Mental Hygiene.

Contrary to popular ideas, overwork rarely causes the kind of mental sickness called neurosis.

The patient with overwork for a symptom probably goes to his doctor because he has indigestion or headaches or his heart bothers him. The doctor needs to do more than examine his heart and digestive system. He should take a careful history of the patient, seeking particularly for signs of dissatisfaction, conflict or anxiety in daily life.

From 40% to 60% of all patients need sympathetic understanding of their emotional problems for their cure. Once the doctor has satisfied himself that the patient's physical symptoms are due to emotional disturbance, he can tell the patient with authority that giving up emotional symptoms will effect a physical cure.

Science News Letter, November 16, 1946

INVENTION

New Bullet Starts Slowly, Speeds Up

➤ A BULLET or shell that starts slowly and then speeds up is the unique invention of J. D. Evans, Jr., of Washington, D. C., formerly a major in the Army. From the base of the missile a shank projects backward through a gas-tight collar. This permits the powder pressure to act only on the end of the shank until the projectile has moved forward enough to clear the collar and give the powder gases access to its full base, thus speeding it up. Rights in this patent, No. 2,410,435, are granted royalty-free to the government.

Science News Letter, November 16, 1946

PHYSICS

Calorimeter Measures Power of Microwaves

➤ THE TEMPERATURE rise of water through which high frequency radio waves are passed measures the power of microwaves in a new accurate instrument.

It is an important invention with the increasing use of very high frequency radiation in airplane approach-control, television, radar, and frequency modulation (FM) broadcasting. The instrument is called a water calorimeter. It is a development of the Polytechnic Institute of Brooklyn.

The research preceding the development was a government-sponsored project at electronic laboratories. Several instruments were invented but only this one proved accurate enough for the exacting demands of design engineers.

This will enable engineers to improve the design of high frequency equipment for specific distances because it accurately measures the power of the radiation. The heat rise in the water depends directly upon the power of the waves. The instrument also will insure the safety of equipment used in radar.

Science News Letter, November 16, 1946

ENTOMOLOGY

Pests Threaten Ban On Incoming Flowers

➤ INSECT PESTS riding as stowaways on orchids, gardenias and tropical fruits entering the United States by air may necessitate new and stringent regulations of this traffic, with an embargo on some of the most glamorous and desirable items. Hearings to determine what measures shall be taken have been scheduled by the U. S. Department of Agriculture for Dec. 5 and 6.

One of the most feared pests, that may find its way into the country in a fragrant and innocent-looking box of gardenias from south of the Rio Grande, is the citrus black fly. Other feared insects that might travel by air include various species of aphids, thrips, scale insects and seed-pod weevils.

Sweeping exclusion of all foreign flowers will not be necessary, in the view of Department officials. Cut tulips and other bulb flowers from the Netherlands, for example, have no known potentialities of harm.

Science News Letter, November 16, 1946

NAVIGATION

Ships Turn Like Crabs

Rotating propellers, to replace clumsy screw type, maneuver ships in less space through crowded waters and enable vessels to dock without tugs.

By BARBARA M. HALL

➤ A NOVEL kind of ship that can turn in its own length and move crab-like backward and sidewise is churning up a lot of interest in marine engineering circles. "Cycloidal" is the name of the new propeller that makes this possible. It consists of blades that look something like the agitator in your mother's washing machine.

Captains of the new rudderless ships can maneuver them into a crowded docking space the way a harassed motorist often dreams he could slide his car into a tight parking space.

It has taken a long time for cycloidal propulsion to arouse the interest of American marine engineers and men of the sea. Shortly after the first World War, Dr. Frederick Kirsten, professor of aeronautical engineering at the University of Washington, invented this radical change in the method of propelling ships through the water. Dr. Kirsten, holder of some 75 patents, was known as a designer of electric power stations, fluorescent tubing, elecric moth killers, wind tunnels and pipes.

Tried on Speedboat

Commercial marine men were not interested in the new propeller, so Dr. Kirsten installed a series of rotating blades on his own 38-foot speed boat. If nationwide publicity had been given the success of the cyclodial propeller at that time, the old type screw propeller might not have guided U S. warships in World War II. Raced against screw-propelled speed boats of identical horsepower, Dr. Kirsten's boat passed each craft with amazing maneuverability.

While Americans smoked Dr. Kirsten's pipe and benefited from his lighting and research corporations, it took the Germans to grasp his cycloidal propeller and put it to wartime use. Adopted and perfected by the Voith Schneider Company in Austria, rotating propellers soon appeared on many small river and harbor craft in Europe.

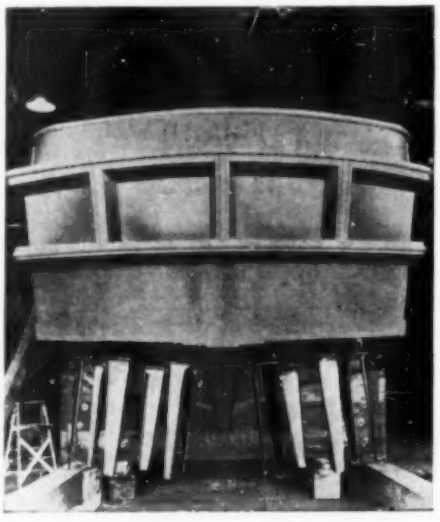
Unlike the cumbersome screw propellers, cycloidal blades are assembled and fitted into a well built into the underwater part of the stern. No rudder and complex stern construction are needed, for the control of the propeller is all tied into a central control stand in the ship's main engine room. Movement of this control lever one way or the other can reverse the ship without changing the engine throttle. To insure that the mechanisms within the propeller hub which is under water at all times remain dry, a special type of rubber gasket seal is used where each blade is joined to the hub.

Blades Are Narrow

Unlike the huge, fan-shaped screw propeller of most vessels, cycloidal blades are narrow and hang from the hub, like knives ready to dig into the water.

With cycloidal propellers, a captain can turn his ship on a dime or stop the craft in its tracks by changing the angle at which the blades turn. Mounted vertically on the rim of a horizontal disc, four or more blades, moved in a 360-degree circle, scull the vessel ahead. The entire disc is revolved by gearing driven by propulsion engines.

Here is the point at which the American and German ideas parted company. The Kirsten "fixed pitch" propeller, like the conventional screw propeller, requires a clutch and engine speed control to alter the motion of the ship.



TUBBY — Cycloidal propellers dip into water like washing machine blades.

The German "variable pitch" propeller also turns the ship by varying the pitch of the blades with one important addition: the angle of the pitch can be changed in any direction without slowing down the engines. No clutch is needed to turn the ship at any speed, yet the cycloidal propeller gives an effect similar to that of the clutch on your car.

More complicated and more expensive to build, the Voith Schneider propeller is now being perfected in the research laboratories of the Army Transportation Corps. Plans and sample wheels of the superior German model, captured from a Voith Schneider plant under shell fire in Heidenheim, Germany, during World War II, have supplied most of the technical information needed to develop the propeller in this country. The Germans had already installed cycloidal propellers on at least 100 fast minesweepers, two aircraft carriers, three catapult ships for sea planes, and four huge self-propelled cranes.

Propeller Passes Test

At Ijmuinden, Holland, a diesel-powered 135-foot German mine-sweeper, equipped with twin variable pitch propellers, was turned over to the Army Transportation Corps. When no deck space for the small captured ship could be found on American-bound freighters, the Army decided to take it across the Atlantic under its own power, even though the mine-sweeper was designed for coastwise service and not for long range cruising.

This was a lucky decision for the future of cycloidal propulsion, for the Voith Schneider propellers proved their seaworthiness under such severe weather conditions that the captain wrote in the log afterward: "without cycloidal propellers the craft certainly would not have survived the rough sea." Her arrival at historic Fort Monroe, Virginia, late in November, 1945, marked a significant event for U. S. marine engineering: the first successful ocean crossing by a rudderless craft equipped with rotating variable pitch propellers.

More than twenty years after his invention, Dr. Kirsten is back in the cy-

cloidal picture. While the Army combed Germany for variable pitch propellers, the Navy constructed two fixed pitch cycloidal propellers, with the aid of Dr. Kirsten.

Strange actions of the Navy landing ship 458 in recent tests of the fixed pitch model at Puget Sound finally aroused the interest of shipbuilders. During the test the LSM 458 saved a powerful tug from disaster when wind and tide conditions in Puget Sound were at their worst. Had the craft been equipped with screw propellers instead of the cycloidals, maneuvering limitations would have left both ships high and dry on the beach.

Superiority Proved

Once again cycloidal propellers proved superior to screw installations—this time for the Army. An Army 46-foot tug, equipped with a 110 horsepower gas engine and cycloidal propellers, in a tug of war with a 165 horsepower diesel tug, actually pulled the opposing ship backwards—even when handicapped by the conventional ship's head start.

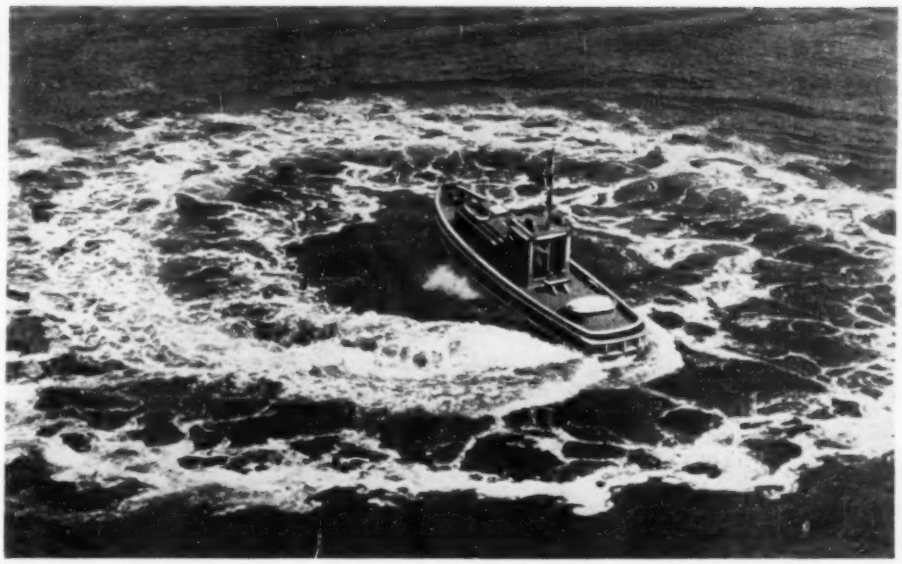
In an attempt to duplicate the advantage of the German wheel at less cost and in a design more suitable for mass production in this country, the Army, with the aid of Dr. Kirsten, is installing variable pitch propellers on a 125-foot experimental mine planter. Tests have not yet been run on the mine planter, but by the time it is ready, the Army plans to have completed three or four additional cycloidal designs better than the German model.

Inland waters, crowded with harbor tugs, floating cranes, river towboats, buoy tenders, landing craft, and fishing boats, will see fewer traffic jams once cycloidal propellers take over. It won't be long before small craft, equipped with rotating blades, will move freely in and out of docks.

Cycloidal propellers for the largest—perhaps atomic powered—ships may be farther in the future. So far only smaller craft have been built for experimental tests. But to Dr. Kirsten and the many marine men who have adopted his invention, cycloidal propulsion is not to be limited to river and harbor boats.

Science News Letter, November 16, 1946

Canadian *birds,* that winter in the United States, eat the dark, gritty-looking fruits of the sumac and the pallid, gray-white berries of poison ivy; by digesting the pulp and not the seeds of these plants, the birds spread the seed far and wide.



CRABLIKE—Navy landing ship, equipped with rotating propellers, turns in its tracks.

GENERAL SCIENCE

Boys See Aircraft Shows

➤ TWO HUNDRED teen-age boys aiming for careers in science, especially aeronautics, from Detroit, Columbus, Cincinnati, Buffalo, Indianapolis and Cleveland are guests of the Navy at the National Aircraft Shows in Cleveland Nov. 15-24.

Each day for five days 20 boys, Navy Science Cruisers, will be flown by the Navy from their home cities to join their 20 fellow Cruiser-hosts in Cleveland. The 40 boys will be special guests of the Navy at the National Aircraft Shows and on a guided tour through the Cleveland laboratories of the National Advisory Committee for Aeronautics, seldom seen by the public. The visitors to Cleveland will be returned to their home cities by Navy planes at the end of the day of science sightseeing.

The 200 boys have been nominated as Cruisers for excellence in science as indicated by their school records and their science accomplishments. Many of them plan careers in aeronautics and scientific research. All of them are juniors and seniors in high school.

'The Navy is making a contribution to stimulating science among secondary school students," explained Vice Adm. Harold G. Bowen of the Navy's Office of Naval Research.

"We are concerned with increasing the number and improving the quality of scientists in this country. Scientific research and development has reached a point in our lives where to ignore it or even be casual about it would be folly of the highest order."

This is the second Navy Science Cruiser program. (See SNL, Oct. 19, 1946.)

Science News Letter, November 16, 1946

ASTRONOMY

Eleventh Magnitude Comet Is Spotted in Columba

➤ A FAINT comet has been located in the southern constellation of Columba, the dove. When spotted on Nov. 1, it was of the eleventh magnitude, far too faint to be seen with the naked eye or binoculars, according to a cablegram received at Harvard Observatory from Dr. J. S. Paraskevopoulos, superintendent of Harvard's Southern Astronomical Station.

Located by M. J. Bester of Bloemfontain, South Africa, the comet will be named after its discoverer. Mr. Bester also spotted a faint comet early in October, but this was later identified as the recurrent Comet Temple 2.

The new comet had moved into the constellation of Caelum, the graving tool, when sighted on Nov. 5 by Dr. G. Van Biesbroeck of the Yerkes and McDonald Observatories of the Universities of Chicago and Texas.

Science News Letter, November 16, 1946

Do You Know?

Before the war, 85% of the world's *cloves* came from Zanzibar and Pemba, two islands off the coast of East Africa.

The southern states had 15 times as many forest *fires* last year as any of the other four national regions.

The softening agent used on the hair in one "cold wave" treatment is *thioglycolic acid;* this produces as a by-product hydrogen sulfide, a poisonous gas.

A 400% increase in consumption of citrus fruit and a 30% decrease in potatoes and grain products reflect striking changes in Americans' *diet* during the last 37 years.

Corrosion causes greater loss of money than fire and flood together; as much as 40% of all iron and steel fabricated is used for replacements for parts which have become corroded.

QUICK-READING TEMPERATURE-CONVERSION TABLES

For speed, when you're converting degrees F to C, and vice versa, you can now use a simple, compact "Sauveur-type" table all the way from absolute zero to 1750 C and 3182 F, in increments of one degree.

For quantities, there's a slight charge: ten copies for 75c; 50 for $3.25; 100 for $6.00. To minimize bookkeeping, kindly order from our Advertising Dept., and include check for exact amount . . . but please note that a single copy will be sent free on request. Better get one. Ask for Note Book EN-33(1).

LEEDS & NORTHRUP COMPANY 4977 STENTON AVE., PHILA 44, PA.
LEEDS & NORTHRUP
MEASURING INSTRUMENTS · TELEMETERS · AUTOMATIC CONTROLS · HEAT-TREATING FURNACES
Jrl. Ad EN-33(1)

MEDICINE

Oxygen Utilization Aided

Cytochrome C, protein found in all living tissue, promotes the use of oxygen in the body, relieving heart disease and hardening of the arteries.

➤ A LIVING TISSUE chemical given by injection promises new relief for sufferers from painful heart disease and perhaps for hardening of the arteries.

It may rescue some from mental disorders due to oxygen lack. Called cytochrome C, the new chemical treatment is reported by Drs. Samuel Proger and D. Dekaneas of Tufts Medical College and the Pratt Diagnostic Hospital of Boston in the journal *Science,* (Oct. 25).

Patients have been helped already. Angina pectoris has been relieved. Some unable to make more than a few steps because of excruciating pain in the legs, due to a condition known as intermittent claudication, have walked without pain.

The treatment consists of injections of cytochrome C. This is a protein normally present in the body and in fact in all living tissue, plant or animal. It is not poisonous so can be safely used, perhaps even in quite large single doses. Its normal function is to promote utilization of oxygen by body tissues.

This is the reason for its effectiveness in probably a wide variety of serious diseases. Lack of oxygen in the cells of blood vessels and various other body tissues is the common underlying cause of many disorders, from the black-outs of pilots during the war to angina pectoris, certain mental disorders and poisoning from overdoses of barbiturate sleeping medicines.

In conditions of oxygen lack, even so severe that the patient is barely conscious, the Boston doctors point out there is considerable oxygen circulating in the blood in the veins. A way to help the tissues use this oxygen, they reasoned, might save the patient.

Giving cytochrome C seems to be the way. An increase of oxygen consumption of 50% to 100% can be achieved with the aid of this chemical, they found in test tube experiments.

Science News Letter, November 16, 1946

AERONAUTICS

VHF Beams Guide Planes

➤ AIRPLANE beacons that flash in the night are on their way out.

Invisible, static-free very high frequency (VHF) radio beams are to take over the task of guiding transport planes over the skyways. VHF radio beams will be useful in cloudy and foggy weather as well as at night to properly equipped planes.

The impending betterment in radio ranges was made known to the Institute of Aeronautical Sciences by T. P. Wright, U. S. Administrator of Civil Aeronautics. The very high frequency ranges are being installed to replace low frequency beams widely used on the radio ranges. These will make the lights unnecessary when all planes are equipped with proper receivers.

Radio ranges and lights are still the backbone of the 40,000 miles of federal airways. The lights are still important for private planes not yet equipped for radio beam receiving.

Nine complete airways are being equipped with four-course aural visual ranges in a high frequency band. One has been in successful use since early last spring, and others are nearing completion. They are substantially free from static.

The new VHF transmitters will be stationed along airways at intervals of about 100 miles. The type being installed, called omni-directional, shoots signals in all directions. The present low frequency signals are shot only in four directions.

Loran, a low frequency navigation system for surface vessels and planes developed during the war, is the current standard for long range overseas operations. It will also serve over deserts and jungles where it is not possible to build the many VHF range sites required.

Science News Letter, November 16, 1946

ENGINEERING

Piped Hot Water Melts Snow, Ice from Roads

➤ WINTER'S coming, and at least one roadway is ready to face the snow and ice that block or slow traffic. A 600-foot-long road has hot-water pipes embedded in the concrete to keep it clear.

The two-lane roadway between the plant of the American Cyanamid Co. and a main thoroughfare has a constant upgrade from the plant. Snow and ice can make this virtually impassable, so the hot-water melting system has been installed in preparation for winter.

Eight black wrought-iron pipes have been embedded in the road's eight-inch concrete, providing two pipes 18 inches apart beneath each wheel track. Through these 600-foot pipes will run approximately 50 gallons of water per minute at an average temperature of 165 degrees Fahrenheit when snow or ice threaten to form on the road.

This system can remove one inch of snow or one-tenth of an inch of ice in an hour under maximum operating conditions. A greater snowfall than one inch in an hour is considered unusual, and a system designed for greater melting power is believed impractical.

Science News Letter, November 16, 1946

INVENTION

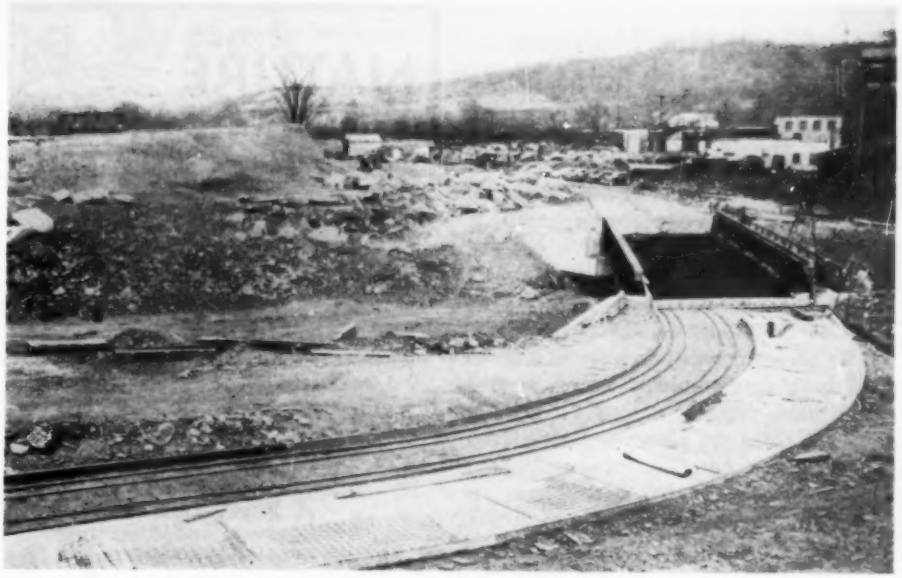
Household Ice Cubes Made Commercially

➤ ICE CUBES, household size, can be made commercially in quantities by a machine recently patented. It is relatively simple, inexpensive and durable, and the cubes when frozen slide out automatically.

A rotating drum, within which the refrigerants are placed, has a considerable number of separated ice cube molds projecting inward. In rotating they pass through outside water for freezing and pick up a little water in each revolution. Within the drum is a chamber holding freon, and between this chamber and the drum brine is placed. The freon cools the brine and the brine freezes the water. The cubes in the molds are built up as the drum revolves. Adding a little warm brine loosens the cubes, and they drop out of a special chute.

The inventor, who received patent 2,403,406 on this machine, is Arthur D. Smith, Canton, Ohio. It is assigned to Barium Steel Corporation of Canton.

Science News Letter, November 16, 1946



ROAD HEATER—Hot water flowing through pipes buried in the concrete will keep this driveway of the American Cyanamid Co. free from ice and snow.

MEDICINE

Preventing Heart Trouble

➤ HOPE THAT doctors may be able to forestall attacks of acute coronary thrombosis, a form of heart trouble, by continuous use of the drug, dicumarol, appears in a report by Drs. E. Sterling Nichol and David W. Fassett of Miami at the meeting of the Southern Medical Association.

One man who had three heart attacks within 13 months has been free of them and active in his business for the past 32 months during which he has been getting doses of dicumarol. Another patient who had three attacks within 17 months was free of further attacks for 21 months. Then he had a fourth and fatal attack. A blood test just before he died indicated he probably had grown careless about taking the medicine. Three other patients who had had multiple attacks of coronary thrombosis have been getting dicumarol for six months and have been free of attacks during this time.

The small number of patients and the fact that some persons with coronary thrombosis may go a number of years without attacks make it impossible to draw conclusions about the value of this prophylactic use of dicumarol, the Miami doctors point out. They believe the results justify further trial.

Coronary thrombosis is a condition in which a clot forms in a branch of the coronary artery supplying blood to the heart. Depending on the size, number and location of such clots, the heart may be deprived of blood and oxygen to such an extent that it cannot go on pumping blood through the body.

Dicumarol, first discovered in spoiled sweet clover which sickened cattle, is an anti-clotting agent. It is safe to use if careful tests are made frequently to be sure the blood has not lost too much clotting ability. Otherwise there might be danger of fatal hemorrhage. It has been used for several years to treat patients with coronary thrombosis, but its continuous use to prevent them is new. Autopsy studies of the patient who died revealed no ill effect from long continued use of dicumarol.

Science News Letter, November 16, 1946

OBSERVOSCOPE STAR FINDER

Something new under the Stars; The instrument that points directly to the star. Requires no calculations. A valuable aid to Beginners, Students, Amateur Astronomers, Scouts, Surveyors, Teachers. Constructed of plastics; 7 in. high.

Price $10.00
F.O.B. Philadelphia, Pa.

W. H. REDDING
DEPT. C11 • 5105 NEWHALL ST. • PHILA. 44, PA.

INVENTION

Man Resembles Martians In New Pressure Suit

➤ MEN WILL LOOK like Martians when they zoom their jet-planes into the stratosphere, if a pressure suit designed by three Goodrich engineers comes into general use. U. S. patent 2,410,632, issued to R. S. Colley, C. P. Krupp and D. H. Shook, has been assigned by them to the B. F. Goodrich Company.

The problem was to encase a man in something that would maintain normal atmospheric pressure around his body at great heights, yet allow complete freedom of movement. The torso and upper arms could be covered with pieces resembling fourteenth-century plate armor, but greater flexibility had to be provided for the coverings of elbows, hips and knees.

This was achieved by annular bulges of rubber-impregnated fabric, one above another, giving the general appearance of a series of pneumatic tires. Longitudinal straps hold the segments in line.

Over the wearer's helmeted head is a second, transparent covering, looking very much like an inverted goldfish bowl, gasketed securely against the ring-shaped neckpiece. Tubes for air and oxygen and wires for heating electricity are let in through one hose attachment at the waist.

Science News Letter, November 16, 1946

An *eggshell* is about 98% calcium carbonate.

YOUR
HAIR
AND ITS CARE
By O. L. Levin, M. D. and H. T. Behrman, M. D.

NEW, REVISED, EXPANDED EDITION—JUST OUT!
If you want healthy hair, lovely hair, then you need the expert advice in this book.

Two medical specialists have here pooled their knowledge to give you in plain language the up-to-date scientific facts now available about hair. They tell you what to do to save and beautify your hair, stimulate healthier hair growth, and deal with many problems, common and uncommon, as:

Dandruff—gray hair—thinning hair—care of the scalp—baldness—abnormal types of hair—excessive oiliness—brittle dryness—hair falling out—infection—parasites—hair hygiene, etc., etc.

Medical science is better equipped than ever before, to prevent hair trouble; or, if it already exists, to deal effectively with it.

"A worthwhile book full of important information."
—Ohio State Medical Journal.

Price $2.00, incl. postage, 5-day-Money-Back Guarantee

EMERSON BOOKS Inc., Dept. 719-C, 251 W. 19th Street, New York 11

HISTORY OF SCIENCE

NATURE RAMBLINGS by Frank Thone

A Poet's Botany

➤ PROBABLY everyone who has looked at flowers at all carefully has been struck with the similarities between their bright petals and the green leaves on the stem. So obvious is the homology between the two that it is common to hear persons who do not know the names of the parts of a flower refer to petals as "leaves."

This resemblance between leaves and petals was responsible for the venture of the great German poet, Goethe, into the field of botany, and probably for his interest, as a rather serious amateur, in science generally. He pushed the homology as far as he could—and thereby fell into some serious errors—but in the process he produced one of the most interesting essays in speculative botany that was ever published. Titled "An Attempt to Explain the Metamorphoses of Plants," it appeared in 1790, when the poet was 41 years old. A new translation into English, by Dr. Agnes Arber, has just been published by the Chronica Botanica Company, ($15.00).

Goethe saw all plant appendages—sepals, petals, stamens, pistil, bracts, stipules, segments of seed-pods—as metamorphosed leaves. The examples he cites show that he was a close observer of the things he saw in the gardens of his patron, the Duke of Weimar, and in the woodlands around that small but favored city. He paid special attention to the reversion of stamens to petals in double flowers, with traces of their origin in the form of pollen-containing anthers sometimes cropping up on the metamorphosed members.

In his attempt at an explanation he was not so fortunate. He started out with a preconceived idea (always fatal in science) that the "crude saps" of the roots and more remote region of the stem became progressively "refined" as they proceeded towards the flowering apices, the final stage of refinement being the "fertilizing fluid" that resulted in reproduction and the growth of the seed.

The scheme was just too diagrammatic and neat. It was the physiology and developmental morphology of a poet and philosopher, rather than of a scientist. Where Goethe used his eyes and told what he actually saw, he was a good botanist; where he tried to solve the riddle of how these things came to be by pure speculation, he went astray.

Science News Letter, November 16, 1946

MEDICINE

Bearded Lady's Gland Cures Addison's Disease

➤ CURE of a case of Addison's disease by the grafting of an adrenal gland from another patient of the bearded lady type is announced by Dr. L. R. Broster, surgeon to Charing Cross Hospital, and Dr. H. Gardiner-Hill, physician to St. Thomas's Hospital, in a report to the British Medical Association.

The patient, a 33-year-old woman, had been ill for six years with nervousness and depression and stomach trouble which she described as a "nervy tummy." A year before the operation her skin took on a smoky brown color characteristic of Addison's disease.

For a year before the operation she had to take four teaspoonfuls of salt daily and also was given injections of adrenal cortical hormone. Failure of the adrenal glands to produce the normal amount of this hormone is the cause of Addison's disease.

Up to the present time, 14 months since the gland-grafting operation, the patient has been well and no longer takes salt or hormone injections.

The gland which cured her was taken from another young woman who suffered from overactive adrenal glands. This affected her sex glands and she became something like the bearded ladies of circus sideshows, having to shave daily. She also was depressed, but her mental condition was more serious than that of the Addison's disease sufferer. She had hallucinations and, contrary to previous experience, her mental condition got worse after the gland was removed. Under psychiatric treatment she recovered and was left with only slight hairiness of her face.

Science News Letter, November 16, 1946

Books of the Week

AERODYNAMICS—A. Wiley Sherwood—*McGraw-Hill,* 220 p., diagrs., and tables, $2.75. In this book the author covers the more practical aspects of both theory and experiment in the field of aerodynamics. Emphasis has been placed upon the physical phase of the theory in order to hold the student's interest and to provide a general background suitable for more intensive mathematical work in the subject.

ARE YOU CONSIDERING PSYCHOANALYSIS?—Karen Horney, M. D., Ed.—*Norton,* 262 p., $3. This book is directed to those who may be considering analysis for themselves or for their friends or relatives. Wherever possible its authors have given factual information. They convey an understanding of the meaning and goals of analysis and give to those who are seriously interested a clearer picture of its nature and aim.

CATHODE-RAY TUBES AND INSTRUMENTS—*Du Mont Laboratories,* 160 p., diagrs., illus., and graphs, $1.00. A reference manual which contains the latest information pertaining to design, specification, and application of commercial cathode-ray tubes, oscillographs and associated equipment.

CONDUCTION ANESTHESIA: Clinical Studies of George P. Pitkin, M. D.—Edited by George L. Southworth, M. D. and Robert A. Hingson, M. D.—*Lippincott,* 981 p., illus., diagrs., and tables, $18. A new book based on a 25-year clinical study of conduction anesthesia. The editors give a clear, authoritative picture of the clinical advantages of all anesthetic methods which interrupt nerve conduction without disturbing the mental faculties of the patient or interfering with body metabolism.

THE EARTH AND THE STARS—C. G. Abbot—*Van Nostrand,* 288 p., illus., diagrs., graphs and tables, $3.75, rev. ed. This is the story of the enigma of the universe; of the stars and constellations and their relationship to the earth. The book contains information for everyone who wishes to learn more about the natural phenomena that surround him.

THE HUMAN FRONTIER: A New Pathway for Science Toward a Better Understanding of Ourselves—Roger J. Williams—*Harcourt, Brace and Co.,* 314 p., $3. The author of this trail-blazing book discusses the urgent responsibilities of natural scientists in the field of social relations. In simple, straightforward language, he tells of the latest research work concerning human behavior.

MEDICAL RESEARCH: A Symposium—Austin Smith, M. D., Ed.—*Lippincott,* 169 p., illus., $5. Here is medical research revealed with the candid perception of key men in the field. They trace the development of medical research from the philosophic view point, through laboratory and clinical trials, production, and publicizing. They present the role and inter-relation of all participants in medical research—the objectives, obligations and purposes of their work.

OIL ACROSS THE WORLD: The American Saga of Pipelines—Charles M. Wilson—*Longmans, Green and Co.,* 318 p., illus., $3.50. In this book, the author traces the evolution of the pipeline through its infancy. In words easy to understand, he brings the pipeline to maturity, and along with the pipeline he traces the growth of the petroleum industry.

A PASTURE HANDBOOK—A. T. Semple, H. N. Vinall, C. R. Enlow and T. E. Woodward—*Gov't Printing Office,* 88 p., illus., and tables, paper, 15 cents. U. S. Dep't of Agriculture Misc. Publication No. 194.

PRIDE—THE SADDLE HORSE—*Encyclopaedia Britannica Press,* 40 p., illus., 50 cents. The action photos give the true life story of the training of Pride, the saddle horse. Its magnificent pictures will thrill even the youngest lovers of horses. Encyclopaedia Britannica True Nature Series, Book 7.

THE PRODUCTION OF TOBACCO—Wightman W. Garner—*Blakiston,* 516 p., diagrs. illus., and tables, $4.50. Here is a comprehensive survey of the essentials of tobacco production and its problems, including the inter-relations of other phases of the industry.

QUANTITATIVE CLINICAL CHEMISTRY: Interpretations—John P. Peters, M. D., and Donald D. Van Slyke—*Williams & Wilkins,* 1041 p., diagrs., tables and charts, $7. This volume covers the overall energy changes, and the chemistry and metabolism of the three major foods—carbohydrates, lipids, and proteins. Volume I.

RITUAL: Psycho-Analytic Studies—Theodor Reik—*Farrar, Straus and Co.,* 367 p., $5. The author opens the first volume of his study of the psychological aspects of religion with a consideration of ritual rather than of mythology. The analytic research into ritual shows the connection between the religion of today and the superstitious beliefs of prehistoric times and throws a surprising light on the significance of modern and ancient religion.

SO YOU WERE ELECTED—Virginia Bailard and Harry McKnown—*McGraw-Hill,* 264 p., diagrs., and illus., $1.80. In the student's own language and with appealing informal approach, this book brings to students real understanding of the qualities needed for successful student leadership, the duties of the leader, and the carrying out of student social activities in the modern high school.

TEXTBOOK OF ABNORMAL PSYCHOLOGY—Carney Landis and M. Marjorie Bolles—*Mcmillan,* 576 p., illus., and diagrs., $4.50. This textbook has been written primarily for the use of the undergraduate student. The material is directed to those students who are majoring in psychology, education, sociology, biology, or theology.

VICTORY OVER PAIN: A History of Anesthesia—Victor Robinson, M. D.—*Shuman's,* 338 p., illus., $3.50. In this book the author has written a comprehensive and fascinating account of the entire story of anesthesia, ranging from the "Drugs and Dreams" of earliest times to "Curare," the horror-drug of the jungle whose poison has been tamed by science and turned into a messenger of mercy.

Science News Letter, November 16, 1946

MEDICINE

Vaccine to Protect Against Flu Epidemic

➤ THE NEW vaccine against influenza A and B protects about 60% of those vaccinated. In event of an epidemic it might reduce absenteeism from 500 man-days to 200 per 1,000 employees. It would reduce overall yearly rate of absenteeism from all respiratory diseases such as colds, tonsillitis, grippe and influenza by only 6%.

These figures were presented by Dr. Anna M. Baetjer, of Johns Hopkins University, at the meeting of the Industrial Hygiene Foundation.

The common cold, she reported, accounts for one-fourth the annual billion-dollar loss due to respiratory diseases. There has been no reduction in absenteeism from this cause in the past 30 years.

"A study of past epidemics suggests that an epidemic of influenza A may possibly occur this winter but it is not certain whether such an epidemic would be general throughout great areas or would affect only certain local regions," Dr. Baetjer said.

"Industrial vaccination should not be started until there is some evidence of either influenza A or B in the community or neighboring areas. Such warnings may be expected from public health authorities or certain influenza research laboratories in various parts of the country. Persons sensitive to eggs should not be vaccinated since serious allergic reactions and even death may occur."

Science News Letter, November 16, 1946

BOOKS

SCIENCE NEWS LETTER will gladly obtain any American book in print for subscribers.

Send check or money order to cover regular retail price. If price is unknown, send $5 and change will be returned. We will pay postage in the United States.

When publications are free, send 10c for handling.

Book Department

SCIENCE NEWS LETTER
1719 N Street, N.W.
Washington 6, D. C.

·New Machines And Gadgets·

❁ *ALL-METAL thermometer with a dial face has extra pointers that record maximum and minimum temperatures during any period, and remain in position until manually reset. The pointer that changes with the temperature pushes these others along with it as it moves in either direction.*

Science News Letter, November 16, 1946

❁ *INNER GRATE for a tobacco pipe is a perforated aluminum disk that fits in the bowl, leaving a small space between it and the bottom. With it the draft is distributed to the whole body of tobacco, creating a smooth and soothing smoke, it is claimed. . .*

Science News Letter, November 16, 1946

❁ *READING LAMP, attachable with spring clamps to a bedstead, gives bright or dim light as wanted. The electric bulb is within a double casing, one section of which rotates within the other when a string is pulled, thus enlarging or narrowing the slit through which the light escapes.*

Science News Letter, November 16, 1946

❁ *SHOWER HEAD for shower baths has a simple arrangement for dislodging any particles, rust or sediment that may become lodged within it. The bullet-shaped head has a button on its face which, when pushed, permits the water to drive out all foreign matter.*

Science News Letter, November 16, 1946

❁ *WALL VENTILATOR, of the built-in type, has gleaming white grille of plastic instead of the usual metal. It offers a minimum resistance to air flow and is easily cleaned. The picture shows how it harmonizes with other installations. Its three-bladed propeller type fan is behind the grille.*

Science News Letter, November 16, 1946

❁ *CARGO landing container, bomb-shaped, remains upright during descent from a plane. Its upper cover is a removable cap that automatically lifts off en route and acts as a parachute. The container proper can slide like a piston within an air compartment in the lower end; the air thus compressed lessens the impact shock on landing.*

Science News Letter, November 16, 1946

❁ *VIOLINS, clarinets and other musical instruments are made of transparent plastics that were used extensively for bomber noses and gun turrets during the war. It is an acrylic plastic, easily molded and light in weight. The instruments have good tone, and are unaffected by weather changes.*

Science News Letter, November 16, 1946

❁ *AIR-FOAM nozzle for fire-fighting mechanically creates the foam by scientifically mixing water, air and a special foam-forming liquid within it and discharging the mixture through the nozzle tip. The air-foam is particularly effective in extinguishing fires in flammable oils, paints and varnishes.*

Science News Letter, November 16, 1946

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 337. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

Question Box

AERONAUTICS

What is the new guide for planes? p. 316.

CHEMISTRY

How is glycerin made from sugar? p. 312.

What is the biggest recent advance made in the development of penicillin? p. 307.

What shortage does the plastics industry face? p. 313.

ENGINEERING

From what will alcohol be produced at the experimental pilot plant? p. 310.

MEDICINE

How can eyes be saved from chemical burns? p. 311.

How does grafting cure Addison's disease? p. 318.

What form of heart trouble is checked by dicumarol? p. 317.

NAVIGATION

What is the chief advantage of the cycloidal propeller? p. 314.

NUCLEAR PHYSICS

What was the first experiment in the new cyclotron? p. 308.

OPTICS

What is the test that may help children to like school? p. 309.

WILDLIFE

How does a male "mother" fish incubate eggs? p. 312.

Where published sources are used they are cited.

You Have A Friend

PLEASE PRINT

Friend's Name.....

Address.....

Your friend has seen **Science News Letter** in your home or office. Maybe he or she has picked it up, showed interest. If you would like us to mail him a sample copy free, we will be glad to do so. We will be glad to mention your name when we send the sample. Please fill in your friend's name and address below and mail this entire coupon to Science News Letter, 1719 N. St., N. W., Washington 6, D. C.